POPULAR
Computing
WEEKLY

22 July 1982 Vol 1 No 14

35p



Voyager on BBC

Spectrum character designer

Vic screen print

Summer camps

Skymath

Win a ZX Spectrum & ZX Printer - details inside

POPULAR
Computing
WEEKLY

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How to submit articles
Articles which are submitted for publication should not be more than 1000 words long.

All submissions should be typed and a double space should be left between each line.

Programs should, whenever possible, be computer printed.

At present we cannot guarantee to return every submitted article, so please keep a copy.

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week


Cover illustration by Stuart Hughes

Editorial

The microcomputer market is starting to hot up. The furore surrounding the launch of Sinclair's ZX Spectrum had hardly begun to die down before two new microcomputers appeared on the scene.

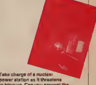
The Dragon 32 and the £50 Binatone micro will both challenge Sinclair's dominance of the home computer market. In addition, Acorn's Electron and Commodore's new range of Vics are lurking in the background.

Even established manufacturers, such as Texas Instruments and Atari, have been forced to cut their prices. The Atari 400 and the TI99/4A are now selling for less than £200, a drop of more than £100 in each case.

Increased competition among micro manufacturers can only be of benefit to the user.

Companies will no longer be able to ignore delivery dates with impunity. If a promised micro is not delivered within 28 days, the customer will simply cancel his order and buy another micro off the shelf.

Next Week



Take charge of a nuclear power station as it threatens to blow up. Can you prevent the Melt Down? — A new game for Vic20

Classified

ATARI

WHIZZ KID, programmer needed to help with new book for major publisher

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16K ZX81

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1K ZX81 CHESS

a very sophisticated piece of software considering the limitations of the ZX81 1K machine. It presents a good game requiring a lot of thought

Electronics and Computing July '82

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P-E-P the Program Enhancement Package for the ZX81 (16K) 7 fantastic new features for your basic programs. Only £5.95 from R & R Software 34 Bourton Road Gloucester

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VIC 20 plus some software boxed £145 Super Lander cartridge £14 3K RAM £19 01-661 1488

20 SUPERSTAR programs for ZX81 (1K) something for everyone from kids to cronies £3.50 S Thorn Gwaenynog Lodge Denbigh Clwyd

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Many other products for ZX80 ZX81 ZX Spectrum etc in stock
SAE for details (Catalogue with Order Form)
Haven Hardware 4 Asby Road Asby Workington Cumbria
(We will be at the **EDINBURGH ZX SHOW 24th July**)

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£100 Oric 1 to be launched in October

TANGERINE has completed design work on a new micro which will go on sale in October for less than £100

The Cambridge company has produced the machine under contract for Oric a high-technology investment company

The micro will be known as the Oric 1 and will be based around the 6502 microprocessor with either 16K or 48K Ram

Using extended Microsoft Basic the machine will offer eight colours three-channel sound and a 40 × 24 display

Special features include hi-resolution 200 × 240 graphics preprogrammed sound commands and a 25th screen line for system status reports The Oric 1 uses the same cassette operating system as the Microtan and the ZX Spectrum operating at 1200 or 2400 baud

The first working prototype has been built Most of the hardware and software has been produced and Tangerine now only await delivery of the ULAs

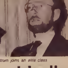
Orders for the Oric will be accepted from October 1 available by mail-order only, direct from Tangerine

The 16K Oric 1 will be competitively priced at between £80 and £90 The 48K version will cost about £140

Defence prompts £30m investment

THE Ministry of Defence's electronic research centre wants to invest more than £30m to compete with the US in producing Very High Speed Integrated Circuits

The MoD needs the UK project to develop high-speed weapon guidance systems It is likely that any such initiative would be linked to a parallel industrial scheme

Clive Sinclair his Spectrum joins an elite class

Spectrum joins the classroom revolution

THE ZX Spectrum has been officially approved for use in schools

The search for suitable micros follows the extension of the Government's ambitious scheme for microcomputing in education

This plan allows half the cost of every micro bought for use in a school to be met by the state

The scheme, originally only applicable to secondary schools, has been so successful that it has now been broadened to include primary education

The campaign is funded by the Industry Department and is not included in the national education budget

Industry Secretary, Patrick Jenkin, has been reported as saying that he has received favourable indications as to the cost effectiveness of the Sinclair machine

The ZX Spectrum now joins the BBC Acorn and Research Machines 380Z as an officially approved micro

Agreement on networking

TWENTY companies including ICL have agreed to adopt standards on networking

The guidelines are in line with those suggested by the European Computer Manufacturers Association The standards apply to open system local area networks

The companies involved include in addition to ICL Xerox DEC, Fujitsu Intel and Siemens

Equipment manufactured by companies adopting the standards will be easily connectable to any system set up under these guidelines

The standards adopted by ECMA are broadly compatible with the Ethernet networking system Ethernet is already being developed by Xerox, DEC and Intel

Holiday break

PRODUCTION of the Sinclair Spectrum has been halted by the annual three-week holiday at the Timex factory in Dundee It will restart on August 3

The Newport Inmos Plant has been designed by Richard Rogers and Partners the same team of architects who conceived the controversial Pompidou Centre in Paris

Dynamic future for Welsh chip Industry

INMOS the Government-financed UK chip manufacturer has produced the first of its new 64K D-Ram devices

It is on these dynamic Ram units that hopes for the company's future rest They are the fastest chips of their type yet available with an access time of 100 nanoseconds

Inmos is backed by nearly £100m of British Technology Group (formerly National Enterprise Board) money

Although the company reported a £17 3m loss last year and may well need further aid to cover development costs, Inmos now supplies over 80 per cent of the world market for 16K static Rams

The world market for 64K D-Rams is estimated to reach £85m this year and is expected to rise as high as £500m by 1985

Test wafers are currently being processed by the plant Production of the 16K chip will begin at the end of the year and that of the 64K D Ram will follow shortly thereafter

The factory will initially provide 200 new jobs

Gloom over silicon valley

NATIONAL Semiconductor the California based silicon chip manufacturer has reported a substantial loss for the financial year to May 31

The deficit of $17m represents a dramatic drop when compared with the company's previous year profit of $94m

These results — the worst reported by the semiconductor industry — result from a general decline in the US chip market This recession has been caused by increasing competition from Japanese companies and by a slump in world demand

In line with a recent upturn in trading conditions NatSemi reports an improvement in the 1981-82 fourth quarter turnover There is hope that the trend will continue

Sharp response

SHARP reacted quickly to deny reports that it is to produce a colour microcomputer for under £100

A spokeswoman commented "it's news to us"

Letters

write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

Thanks for the Vic programs . . . now how do I read them?

HAVING only recently purchased my Commodore Vic20 I was delighted to find other readers programs reproduced in your paper I faithfully try to run them on my Vic if only to gain some experience

Imagine my horror when all the Vic20 programs in the latest issue (June 17) were quite illegible Even "program of the week" was impossible to follow

So please, please, can we have better reproduction, or I for one shall not waste my money on something I cannot decipher

Mrs E K Smith
5 Rowan Green West
Brentwood
Essex CM13 2EB

In a bid to minimise errors, we have been reproducing all our programs direct from the original listings Unfortunately, listings taken from the Vic printer seem to reproduce very badly But, we are aware of the problem and are taking steps to rectify it.

Keeping Sinclair to their 28 day contract

AFTER reading your editorial in the June 10 issue about delivery dates for the Spectrum I decided to follow your advice and make a fuss After all I had waited for five weeks already and had been told by Sinclair that an eight week delay from the time of ordering was due to a technical problem

Following a letter to the Department of Fair Trading I found out that the statement on the advertisement "allow up to 28 days for delivery" is in fact a contract. If Sinclair do not supply the goods within that time period, they are breaking that contract You are then entitled to claim all your money back together with any necessary expenses

I hope this will help you to answer any enquiries about this matter

David Bagnall
4 Drovers Way
Dunstable
Bedfordshire LU6 1AN

But others could keep you waiting for ever

I WAS very interested to read your hardware reviews, particularly the review of the Fuller keyboard (June 17) I agree it is a good system if you like waiting

It is hard enough getting them to reply to a letter I ordered the keyboard, case, motherboard and 16K Ram unit to fit the motherboard on January 6 After several telephone calls and letters, everything arrived on April 8, except for the 16K Ram unit

I am still waiting for the 16K Ram and replies to my letters I have now sent a letter to cancel the 16K Ram order and have fitted a dK'Tronics unit which arrived by return of post. Fitting this makes their motherboard useless I hope I am not the only one in this position

A F Saphten
18 Beaconsfield Avenue
Shepherds Bush
London W12 7BL

Hopeless mix-up prompts Nimrod rescue mission

SOMEWHERE in your staff there is at least one galoot of considerable magnitude

In Vol 1 No 12 9 July, you have printed my Nimrod program for the Vic20 You have hopelessly mixed it up with another program

The program finishes with lines 97, 98 and 99, all Data statements

```
97 DATA 0 0 0 120 161 256 161 0 0
   224,224,224 254 254 256 0
98 DATA 0 0 0 0 63 127,255 0 30 12
   12 28 255 252 248,0
99 DATA 4 12 12 30 56 112,98 0 -1
```

Mike O'Connor
102 Phoenix Close
Northwood
Middlesex

Just aching for an Acorn program in Open Forum

I AM one of the thousands of readers who find *PCW* extremely good reading However I am disappointed to see that you do not include the Acorn Atom in Open Forum

I would be grateful if you could enlighten me as to whether us Atom users will be able to benefit from Open Forum in future weeks

Also I missed the first four issues Could you tell me how to get them

Steve Rees
10 Sangster Avenue
Melksham
Wiltshire SN12 7PL

You will find one program for the Acorn Atom in the Open Forum section of *PCW* July 1 We do intend to run some Atom programs in future issues, but we have received very few Atom programs so far

With regard to back numbers of *PCW*, these can be obtained by sending a cheque or postal order for 50p per copy, including post and packing, to Back Numbers, Popular Computing Weekly, 19 Whitcomb Street, London WC2 Unfortunately, we have run out of copies of Vol 1 No 2 but we have all other issues in stock

Avoiding a crash on the labyrinth trail

HAVING unsuccessfully attempted to enter Dave Middleton's Labyrinth program (May 20) on my ZX81 on a number of occasions I had at first attributed the repeated crashes to the well documented "floppy Ram pack syndrome" But noticing that the trouble usually arose in the region of line 2150 I began to suspect that some other factor was at work

The clue came when a Shell-Metzner sort began to return correctly sorted but corrupted data An intensive session of poking and peeking then established that the fault lay at address 18609 where the third bit could not be set — ie binary 1111 (decimal 15) is recorded as 1011 and hence becomes corrupted to decimal 11) This of course corrupts data entered at this address but more importantly causes a crash if either Vars or D-file reaches this point

I have at last made the acquaintance of your Slumberland Dragon In order to do so it was necessary to enter the program until Vars approached 18600 then entering a number of Rem statements to take D-file beyond 18609 while at the same time ensuring that neither line numbers or New/Line characters were entered at the faulty address This naturally implies that a single simple Rem statement is unsuitable for the purpose since during its entry, character by character critical bytes inevitably reach the fault sooner or later

It is therefore necessary to bridge the faulty address by entering a Rem statement ending before it. This is then edited to a new line number enabling it to be re-entered "in bulk" ensuring that the corrupted bytes fall within the Rem statement itself The rest of the program can then be entered normally

I felt that this might be of interest to some readers who may have similar faulty addresses but are attributing their problems to other causes

A small improvement to the program is given by substituting

```
580 IF A$ = "N" THEN GOTO 5000
```

and adding

```
4530 STOP
5000 CLS
5010 PRINT AT 7 8 "THANKS FOR THE GAME
5020 PRINT AT 9 9 "COME AND VISIT"
5021 PRINT AT 11 8 "THE LABYRINTH"
5022 PRINT AT 13 13 "AGAIN
5030 PRINT AT 16 14 "BYE"
5040 STOP
```

Trevor P Duff
36 Weymouth Street
London W1N 3AF



Voyager

A new game for BBC model B
by Jeremy Ruston

Voyager 94 is a development of the Voyager missions launched by NASA in the 1970s

The first Voyager space craft flew past Saturn in November last year, sending back some breath-taking pictures of the ringed planet Voyager 1 is now heading out of the solar system at 46,000 miles an hour Voyager II is on course for Uranus where it is due to arrive in 1986

In Voyager 94 you are a NASA mission controller responsible for the latest unmanned Voyager probe Your mission is to soft-land the Voyager on Jupiter, the red giant But watch out for Jupiter s massive gravitational pull

Once you have successfully landed on Jupiter you can attempt to land on Saturn

This game is for the BBC micro model B only, since it uses 32K Ram and graphics. It is set in Mode 1

To start the game, type *Run* The screen will fill with stars and the two planets, Jupiter and Saturn, will appear Information about your current interstellar co-ordinates and velocity will be printed in the text window

The first stage of your mission is to choose a launching pad Use the cursor left and right keys to position the Voyager on the bottom of the screen Press *Copy* when you are ready to launch the probe

You can alter Voyager s velocity in any direction by pressing the cursor keys But if you go too fast, Voyager will go into overdrive and you will lose all control over her

When you approach either Jupiter or Saturn, you will have to reduce speed or Voyager will break-up on impact. If Voyager is travelling at the correct speed, she will land in one piece

As the planets are constantly in motion, they will be in different positions on the screen each time you play the game

Lines 60-90 initialise the screen and set up the program variables Lines 110-130 update Voyager's co-ordinates while lines 140-210 handle the end of the game Line 230 starts the definition of *Proscreen* line 250 removes the cursor and lines 260-270 set the graphics and text windows

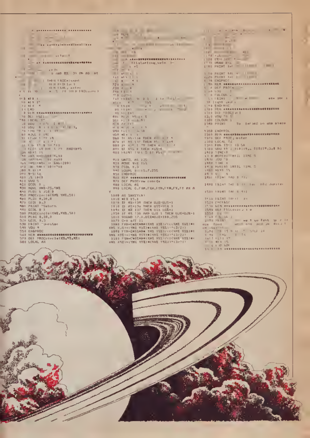
The co-ordinates of the two planets are chosen in lines 340-370 while their masses and that of Voyager are set in lines 380-400 The planets are plotted in lines 410-540 using *Proccircle*

The definition of *Procstarting-velocity* is set in line 660 while lines 690-710 puts the keyboard in the right mode Voyager's co-ordinates are set in lines 720-730 Lines 790-910 allow you to move the ship to her starting position

Line 940 sets up channel 0 for white noise while line 1060 creates the sound effects Line 970 starts the definition of *Procnew-co-ordinates* The ship s velocity is controlled in lines 1000-1060

Voyager s new co-ordinates are calculated in lines 1060-1190 Line 1190 draws a line to the ship s new position Line 1200 updates the interstellar co-ordinates display and lines 1210-1220 display the new velocities

Illustration James Macdonald



```
[illegible]
  REM *****************************
[illegible]
  REM *****************************
[illegible]
  REM *****************************
[illegible] D AND R% [illegible] OR AD [illegible]
[illegible] THEN PROCmissed
[illegible] THEN PROCjupiter
[illegible] THEN PROCwater
[illegible] THEN PROCcomet
[illegible]
  REM *****************************
  DEF PROCsetup
  LOCAL I%
  VDU [illegible]
  VDU [illegible]
  MOVE [illegible]
  FOR I%=1 TO [illegible]
  PLOT 69,RND(1279),RND(975)
  NEXT I%
  XM%=RND(1000)+100
  YM%=RND([illegible])+[illegible]
  XM%=XM%+[illegible]RND(200)
  [illegible]
380 M=[illegible]
390 N=[illegible]
400 [illegible]
410 VDU 5
420 GCOL [illegible]
430 MOVE XM%-75,YM%
440 PLOT [illegible]
450 PROCcircle(XM%,YM%,50)
460 PLOT 0,30,0
470 GCOL 0,2
480 PRINT "Saturn
490 GCOL 0,1
500 PROCcircle(XN%,YN%,50)
510 PLOT 0,30,0
520 GCOL 0,3
530 PRINT "Jupiter
540 VDU 4
550 ENDPROC
560 REM *****************************
570 DEF PROCcircle(X%,Y%,R%)
580 LOCAL A%
[illegible]
  REM *****************************
[illegible] "Starting velo[illegible]
[illegible]
720 [illegible]
730 [illegible]
740 [illegible]
[illegible]
760 PRINT [illegible]
[illegible]
  PRINT [illegible]
  PRINT [illegible]
  REPEAT
  MOVE XS%,[illegible]
[illegible]
  [illegible]
840 [illegible]
850 [illegible]
860 IF A%=138 THEN [illegible]
870 IF A%=137 THEN [illegible]
880 IF [illegible] THEN [illegible]
890 IF XS%<0 THEN XS%=0
900 PRINT TAB(5,0) YS%[illegible]
910 UNTIL A%=135
920 MOVE XS% YS%
930 GCOL 0,3
940 SOUND [illegible]15,7,255
950 ENDPROC
960 REM *****************************
970 DEF PROCrow_comets
980 LOCAL A%
990 LOCAL G,FXM,FXN,FYM,FYN,FX,FY,AX,A
Y
1000 A%=INKEY(0)
1010 *FX 15,1
1020 IF A%=139 THEN UJ%=UJ%+1
1030 IF A%=136 THEN UI%=UI%-1
1040 IF A%=137 THEN UI%=UI%+1
1050 IF A%=138 AND UJ%>1 THEN UJ%=UJ%-1
1060 SOUND 17,0,UI%*UJ%+100,255
1070 G=6.67E-11
1080 FXM=G*MS%*MM*(XM%-XS%)/(((XM%-XS%)*(
XM%-XS%)+(YM%-YS%)*(YM%-YS%))^(3/2))
1090 FYM=G*MS%*MM*(YM%-YS%)/(((XM%-XS%)*(
XM%-XS%)+(YM%-YS%)*(YM%-YS%))^(3/2))
1100 FXN=G*MS%*MN*(XN%-XS%)/(((XN%-XS%)*(
XN%-XS%)+(YN%-YS%)*(YN%-YS%))^(3/2))
[illegible]
1170 [illegible]
1180 EX=JX[illegible]
1190 DRAW X[illegible]
1200 PRINT TAB[illegible]
1210 PRINT TAB[illegible]
1220 PRINT TAB[illegible]
1230 ENDPROC
1240 REM *****************************
1250 DEF PROC[illegible]
1260 VDU [illegible]
1270 COLOUR [illegible]
1280 PRINT [illegible] new you [illegible]
[illegible] light years
1290 ENDPROC
1300 REM *****************************
1310 DEF PROC[illegible]
1320 VDU 28[illegible]
1330 COLOUR [illegible]
1340 PRINT [illegible] You [illegible] to one place
"
1350 ENDPROC
1360 REM *****************************
1370 DEF PROCjupiter
1380 LOCAL T%
1390 FOR T%=1 TO 50
1400 VDU 19,[illegible]
1410 TIME=0
1420 REPEAT UNTIL TIME=5
1430 VDU 20
1440 TIME=0
1450 REPEAT UNTIL TIME=5
1460 NEXT T%
[illegible]
1480 PRINT TAB(0,[illegible])
1490 PRINT TAB(0,[illegible]) [illegible] Jupiter
1500 PRINT TAB(0,[illegible])
1510 PRINT TAB([illegible])
1520 ENDPROC
1530 REM *****************************
1540 DEF PROC[illegible]
1550 [illegible]
1560 [illegible]
1570 PRINT [illegible] go fast [illegible]
[illegible]
[illegible] STEP 10
[illegible]
[illegible]
[illegible] 15
[illegible]
[illegible] REM *****************************
```

Another bunch of characters on the menu

Jeremy Hall presents a simple program for creating graphics characters on an 8 x 8 grid

This program is called Character Designer and allows you to take full advantage of the user definable graphics facilities of the 16K Spectrum

When Run, the program presents you with a menu of options To design your character type in the letter D This presents you with an 8 × 8 grid and the prompt 'Line? Type the line number (0 returns you to menu) and enter it The prompt now asks 'Column , to which you reply with another number

A third prompt asks 'Plot or erase? Typing P will fill in the pixel while typing E will erase it When you are happy with the design type 0 after the 'Line? prompt to return you to the menu

Having designed the character. Type C You will be asked which user definable graphics letter you want to become the new character Typing any letter between a and u will start the process After a couple of seconds your new character appears

Next press any letter to return to the menu Type D again to design more characters Type E to print up all the 21 user definable graphics as they stand

Returning to the menu and typing S V or L will allow you to *Save*, *Verify* and *Load* your new character set. Only the characters will be *Saved* not the whole program

The Design part of the program appears to be a re-useable piece of graph paper However, if you examine line 75 you will see that the pixel status is stored in X(8,8) This is used in the creation of the characters in line 240 The C loop reads each pixel while the L loop increments the line Z stores the decimal values to be poked into the graphics character in lines 300-320

The rest of the program is self-explanatory If you should accidentally stop the program typing *Goto 1000* as a direct command will take you back to the menu

```
   2 BORDER 0  PAPER 0  INK 7  C
LS
   3 DIM x(8,8)
   5 GO TO 1000
   7 DIM x(8,8)
   8 CLS
  10 PRINT AT 7,12,"12345678"
  20 FOR n=1 TO 8  PRINT AT 7+n,
11,n  NEXT n
  25 PLOT 95,48  DRAW 0,64  DRAW
 65,0  DRAW 0,-65  DRAW -65,0
  30 PRINT INVERSE 1,AT 11,6,"LI
NE"
  40 PRINT INVERSE 1,AT 5,13,"CO
LUMN"
  50 INPUT FLASH 1,"LINE?",l
  52 IF l=0 THEN GO TO 1000
  55 INPUT FLASH 1,"COLUMN?",c
  60 INPUT "PLOT OR ERASE ", FLA
SH 1,"(P or e) ",p$
  66 LET d$=CHR$ (143*(p$="p")+1
28*(p$="e"))
  70 PRINT AT l+7,c+11 d$
  75 LET x(l,c)=-1+2*(p$="p")+(p
$="e")
  80 GO TO 50
 100 REM CREATE
 105 CLS
 110 PRINT ''''
 120 PRINT "Which U.D.G. letter
is to become
 130 PRINT   PRINT "the new char
acter?", FLASH 1,"(A to U)"
 135 INPUT l$  IF l$<"a" OR l$>"
u" OR LEN l$>1 THEN GO TO 135
 140 CLS   PRINT INVERSE 1,AT 11
,8,"C R E A T I N G"
 150 DIM z(8)
 200 FOR l=1 TO 8  LET z(l)=0  N
EXT l
 210 FOR l=1 TO 8
 220 LET d=7
 230 FOR c=0 TO 7
 240 IF x(l,c+1)=1 THEN LET z(l)
=z(l)+2↑d
 250 LET d=d-1
 260 NEXT c
 270 NEXT l
 300 FOR l=0 TO 7
 310 POKE USR l$+l,z(l+1)
 320 NEXT l
 330 CLS
 340 PRINT AT 11,0, INVERSE 1,"B
EHOLD YOUR NEW CHARACTER -", INV
ERSE 0," ",CHR$ (CODE l$+47)
 350 PRINT ' FLASH 1,"Press any
key to return to menu
 360 LET a$=INKEY$  IF a$="" THE
N GO TO 360
 370 GO TO 1000
 500 CLS   REM save
 510 PRINT INVERSE 1,AT 11,2,"NA
ME OF CHARACTERS FOR SAVING?"
 520 INPUT INVERSE 1,"(10 LETTER
S OR LESS)",s$
 530 PAUSE 100
 535 CLS
 540 SAVE s$CODE USR "a",21*8
 550 GO TO 1000
 560 CLS   PRINT AT 11,0,"Press
play on tape player"
 565 PAUSE 100  VERIFY ""CODE
 568 PAUSE 200  GO TO 1000
 570 CLS   PRINT AT 11,0,"NAME O
F CHAR. SET TO BE LOADED?"
 575 INPUT s$
 580 PRINT ''"Press play on tap
e player"  PAUSE 100
 590 IF s$="" THEN LOAD ""CODE
GO TO 610
 600 LOAD s$CODE
 610 GO TO 1000
 700 BORDER 5  PAPER 5  INK 0  C
LS   REM Examine
 705 LET o=144
 710 FOR n=1 TO 5 STEP 2
 715 FOR m=0 TO 6
 720 PRINT AT n,4*m, INVERSE 1,(
o-143), INVERSE 0,"-",CHR$ o,"
"
 725 LET o=o+1
 730 NEXT m  NEXT n
 740 PRINT AT 11,0,"Press any ke
y to return to menu"
 750 LET a$=INKEY$
 760 IF a$="" THEN GO TO 760
 770 BORDER 0  PAPER 0  INK 7
 780 GO TO 1000
1000 REM initialise and menu
1005 CLS
1010 PRINT   PRINT TAB 8, INVERS
E 1,"CHARACTER DESIGNER"
1020 PRINT ''TAB 2,"Press -
1025 PRINT 'TAB 0,"D for ", INVE
RSE 1,"DESIGN"
1030 PRINT 'TAB 0,"C for ", INVE
RSE 1,"CREATE"
1035 PRINT 'TAB 0;"S for ", INVE
RSE 1,"SAVE"
1040 PRINT 'TAB 0,"V for ", INVE
RSE 1,"VERIFY"
1045 PRINT 'TAB 8;"L for ", INVE
RSE 1,"LOAD"
1050 PRINT 'TAB 0,"E for ", INVE
RSE 1,"EXAMINE
1055 PLOT 43,156  DRAW 0,15  DRA
W 19*8,0  DRAW 0,-15  DRAW -(19*
8),0
1060 PRINT AT 21,14,"© Jeremy Ha
ll 1982"
1070 LET a$=INKEY$
1075 IF a$="" THEN GO TO 1070
1080 IF a$="d" THEN GO TO 7
1085 IF a$="c" THEN GO TO 100
1090 IF a$="s" THEN GO TO 500
1095 IF a$="v" THEN GO TO 560
1100 IF a$="l" THEN GO TO 570
1105 IF a$="e" THEN GO TO 700
1110 GO TO 1070
```

Go camping . . . with a computer!

***David Kelly** looks at a new concept in leisure activities – computer holidays*

Summertime Take a break. Vacations in the sun How about a computer holiday?

The Computer Camp is the brainchild of Stewart Wiley founder of Beaumont Summer Camps This year 5000 young people will spend a week or two in their summer camps Children aged 11 to 17 will spend half their holiday learning to use and program micros and the rest of their time learning any of 29 other activities, from archery to windsurfing to nature trailing

According to Stewart "the kids will have an exciting day, every day"

The concept of the summer camp is not a new one The summer camp ethic is a deep seated part of the American way of life Becaues of the lengthy summer vacation keeping the kids occupied becomes a real problem Summer campe in the US provide some essential relief for parents

It is only recently that the idea has been tried out in this country with much success

Beaumont Summer Campe are pioneers in this field in the UK Stewart Wiley has been involved with the leisure business for 15 years Originally working in the tour holiday market he claims to have "put Corfu on the map"

He saw an interview on US tv with Denison Bollay who first mooted the idea of computer holidays

The Beaumont Computer Camp was the outcome Wiley and Bollay got together in January 1981 and last year the first holiday-goers attended summer camp

Following the success of the 1981 season Beaumont now offer five camps including a residential one in the Lake District

Robin Heath is the man who organises the computer recreation at Tabley Hall just outside Carlisle He explained that between 150 and 200 kids each week will be able to learn or improve their programming Each person gets their own computer — this is the crucial factor — during their computing stay There are two two-hour sessions per day where a variety of skills are explained There are introductory courses on Basic with training in machine code and assembler languages for the more advanced user

The camp will have 30 ZX81s and 50 ZX Spectrums in use Anyone wishing to learn Pascal will be able to use a Pet 4000



Summer camp founder Stewart Wiley

As Robin explains "Nothing is forced on them — the motivation for learning comes from the kids themselves"

He is a lecturer at a North London polytechnic and is very keen that the kids should learn as well as having a good time He says "It is not a competitive environment Everyone has their computer and they learn at their own speed

"Last year was the first year We were worried the novelty of computers would wear off during the week Instead we had great difficulty in separating them from the micros

"We had 12 and 13-year-olds writing the sort of programs my first year degree students are asked to produce I'm sure this is because they have less inhibition and more imagination They don't know what is expected of them — more importantly they don't know what they are not expected to be able to do

The Tabley Hall camp employs about 12 people to supervise the computer courses so that the pupil/teacher ratio is 7 1 Each of the helpers is selected by Robin to make sure they will be able to provide tuition at the right level

Whether or not the campe will appeal to you rather depends on whether you like the idea of a "structured yet informal programme" of instruction and adventure

The other deciding factor may be the cost Full board and accommodation at the adventure camp costs £118 per person per week plus a £30 supplement for the computer camp option A two-week stay is recommended

The Computer Campe are proving to be very popular this year although there are still some places remaining unbooked

Their success has caused Beaumont Summer Camps to plan further expansion Later this year they are planning to hold winter holidays for organised official school parties

For further information and a free colour brochure write to Beaumont Summer Camps 100 New Kings Road London SW6 (Tel 01 736 3272)

We want to hear from you!

Whether you are starting a near club, holding a special meeting, or just changing the venue, we want to hear from you

Write to David Kelly, Club News, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF or call him on 01-930 3271.

What's happening

80-bus News is a bi monthly news magazine for Nascom and Gemini users Details from Interface Data Oakfield Corner Sycamore Road Amersham Bucks

South Northants Computer Club meets every week in the A5 Rangers Hall Watling Street West Towcester A wide range of micros are represented at the meetings which start at 7 pm Contact Simon Clark 83 Watling Street West, Towcester North ants (Tel 0327 52191 or 0327 50705)

6800 Users Group Newsletter is an information exchange for 6800/SS-50 owners Contact T K Boyd Belmont School Feldemore Holmbury St Mary Dorking Surrey

Fife Computer Users Club has just been formed The club will provide a monthly newsletter containing news hints tips programs articles and reviews of use to micro enthusiasts in Fife Contact Murray Simpson 31 Tom Stewart Lane St Andrews, Fife

Cardiff '81 Club provides advice and a software library for ZX81 owners Contact Mike Hayes, 54 Oakley Place Grangetown Cardiff (Tel 0222 371732)

Reviews
software

Atom Galaxian

Bug byte, 98-100 The Albany, Old Hall Street Liverpool
Atom 6K text, 6K graphics, cassette
Price £6.00

Ouch! That seems to be a high price to pay for a single Atom program. Still, if you're spending several evenings a week playing it in some cafe, you'll get your money back soon enough.

For this is a typical Bug-byte implementation of a standard electronic arcade game. You are probably aware of it already. It is basically *Invaders*, but this time ships from the approaching army swoop out towards you and try to bomb or ram you off the face of the Earth. "Towards you" is literally true — these ships are programmed to seek and destroy, and they succeed within a couple of seconds if your fingers slip off the keys. There are no shields to skulk under — your only protection is to shoot the attackers or to skip out of the way and let them crash. Replacements follow of course — immediately — and all the time the bombs are falling.

Although I try to avoid computer games, as they're so addictive, I must admit to sneaking off to Bug-byte's *Invaders* on occasion instead of working. *Galaxian* is that much more a temptation as it is that much more difficult. There are only three controls (left, right, fire) but my standard way of surviving at *Invaders* — continuously firing — is not allowed this time. Tough, tough, tough.

The Bug-byte *Galaxian* is fast. There is no choice of level, but it may be that succeeding armies work faster — I don't know as I've not yet got past the first army and Bug-byte provide no instructions. The programming is good, with well designed ships and excellent sound effects. The screen includes a continuous display of current score, highest score and number of lives left. But when you've lost your three lives you go right back to the title frame. Why's that, Bug-byte? It's really annoying.

Summary
Grit your teeth and pay for this superb arcade game for the Acorn Atom. It's got to be the best of the genre. **KJ**

Skymath

Audiogenic Ltd, PO Box 88, Reading, Berkshire
Vic20 cassette 3K
Price £6.99

Skymath is supposed to be the fun way for children to learn addition and subtraction of decimal numbers. The tape and the packaging are of a high professional quality. The cassette fly sheet has a full set of instructions printed on the inside.

I do not know why a simple addition and subtraction program should require a 3K memory expansion. Even with the fancy graphics and sound, it should have been possible to write a program to fit the basic Vic. This cassette is thus limited to those who can also afford the over-priced expansion packs.

Once you have chosen whether to opt for the addition or subtraction *test*, the display presents a scene of green rugged landscape with radar antennae at each side. In turn the antennae shoot red arrows into the blue sky and large yellow numbers appear on the screen.

The first example was 82.69 minus 23.82. I typed in 7 and a thick red line appeared from the left-hand side of the screen to the point where the 7 appeared. It was accompanied by noise. If you get the whole number correct, there is a brief fanfare of sound and the answer disappears step by step into the hills below. The whole process starts over again.

If you make a mistake a small white flying saucer appears at the left of the screen and shoots the whole number.

A small counter at the bottom of the screen tells you how many questions have been answered correctly.

If you want to change from subtraction to addition half way through you cannot. You have to break the program and start again. In other words you lose the count of the number of correct answers.

Summary
The large numbers are poorly designed — many of them are barely recognisable as normal numbers.

At £6.99 and a memory expansion pack this program is too expensive. **DS**

Nowotnik

Phipps Associates, 99 East Street, Epsom, Surrey
ZX81 16K
Price £5.00

This cassette contains three different games — The Nowotnik Puzzle, pictured below, Demolition and Tenpin.

The Nowotnik Puzzle is rather like a two-dimensional Rubik Cube. The Puzzle starts by displaying a square which is divided into four smaller differently shaded squares. Depending on the level of difficulty chosen, these squares are then broken up into a number of smaller squares.

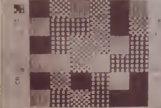
The object of the game is to move the squares around the screen until they match the original pattern. The program records the number of moves taken to complete the puzzle.

As an aid to the player, a miniature version of the original pattern is displayed in the top left hand corner of the screen.

The instructions for the puzzle are excellent. The player is led through a series of examples which demonstrate the different facilities incorporated within the program.

Summary
I only have two mild criticisms to make of this puzzle. Firstly, it is not easy to load, because of the low recording level. Secondly, the miniature version of the puzzle displayed in the top left-hand corner of the screen is too small to read easily.

The two remaining games are less interesting than the Nowotnik puzzle. Demolition is an unsatisfactory mutation of Breakout while Tenpin provides a reasonable simulation of ten pin bowling. **DK**



Reviews
hardware

Telesound 82

Compusound 32 Langley Close, Redditch, Worcs (Tel 0752 21439)
Price £9 95

The Telesound 82 unit designed for the ZX81, is fully compatible with the ZX Spectrum The unit is available from Compusound and was reviewed in *PCW* June 24

According to Compusound's Frank Woodcock when the unit is fitted to the mic socket it 'turns the Spectrum's bleep into a roar The add-on also enhances the click produced when a key is depressed on the new micro — a facility of use when typing in programs

Since the Telesound 82 plugs into the mic socket there is still room to plug a cassette player into the ear socket This allows the Spectrum to bleep in time with a music tape of your choice **DK**

Quicksilva 3K add-on

Quicksilva, 95 Upperbrowmhill Road, Southampton
Price £15 00

This 3K add-on gives ZX80 or ZX81 users extra Ram at low cost The 3K added to the Ram the ZX81 already has provides a total of 4K

Made up of six 2114 static Ram chips, the board has no problem of 'whiteouts due to dynamic Ram It is also fairly insensitive to heat as it is mounted on a printed-circuit board at the back of the computer using a tighter version of the 23-way edge connector

Since the board stands upright behind the computer and has no edge connector at the pack, if anything other than the printer is to be connected up to the computer, such a connector has to be fitted or a motherboard has to be provided

This extra Ram provides enough memory for the ZX81 to recognise automatically on switch-on that it can provide a full screen This means that programs which need a full screen to work but not a full 16K of Ram can be made to run without modification on this Ram board

It is extremely stable and light so there is no fear of Ram-pack wobble causing errors during programs

Two programs are also available from Quicksilva that only require 4K of Ram to provide some interesting arcade games The games are *QS Asteroids* and *QS Defender* Both are very quick because they are mostly written in machine code They illustrate very well just what can be done with a minimum of Ram

If required Quicksilva can supply a motherboard at £12 together with an edge connector at £4 This will leave you with two spare sockets which can contain either a sound board with three channels or a characters board which can provide 128 separately programmable characters for your own games **SA**

Explore Computing

By Richard and Josephine Andree published by Reward Books 232 pages paperback
Price £8 95

This is an American book for the TRS-80 but perhaps surprisingly, the book is not worthy It is well written and pleasing in many ways

The Tandy TRS-80 micro was, until not long ago, one of the most popular machines for home and school use It is still going well if overshadowed by the new species It has a number of appealing features as well as a conventional version of Basic

The latter feature makes this book potentially of wider interest than just to Tandy owners

The Andrees have provided an extremely good introduction to mathematical computing The book arises from a series of courses on mathematics for teachers in Oklahoma

The Andrees go marvellously deeper into mathematics with a micro than any other authors I know If you like mathematics you ll love this book even if you're a ZX81 or Apple user There are plenty of examples and exercises for you to develop yourself The whole is put over with enthusiasm and rare understanding

That rare understanding does not extend to the non-mathematical TRS-80 user *Cload/Csave* are not dealt with until half way through the book There are few games and editing and string-handling are covered almost as afterthoughts

Hard luck on non-mathematical TRS-80 users but great news for devotees of the queen of sciences

Conclusion
The authors have failed to provibe a good introduction for the novice Tandy user However, they have written a very useful book on mathematical computing **KJ**

56K Ram Pack

Downsway Electronics (UK) Ltd, Downsway House Epsom Road, Ashtead Surrey
Price £59 95 (if a 16K Ram pack is sent with order the price is reduced to £49 95)

Downsway Electronics has been selling 16K Ram packs for some time now but only through agents Their units were recognizable as they were the only ones that came in a black, 2½ × 1½ × 1 inch plastic box

The new unit containing 64K of Ram (only 56K is available) is still in the same case The unit is very small and fits perfectly with the style of the ZX81 The edge connector is a very tight fit and Downsway provide a foam strip to stick above the expansion port on the ZX81 so that no Ram-pack wobble can occur Like the Sinclair Ram pack, however, once fitted on the back of the ZX81 the expansion port is covered up Any printer or ports have to be fitted between the computer and the Ram pack

The unit is very well made and, unlike Sinclair's Ram pack, it does not "buzz", even though it is supplied in the same way, direct from the ZX81

Only 56K is available since the bottom 8K (0 to 8K) in the memory map has to be kept clear for the Rom The rest of the memory map is filled with Ram leaving no space for any memory-mapped peripherals

However, it provides the Basic programmer with 48K for his programs plus 8K of memory for machine code, data etc

The 8K Ram from 8K to 16K in the memory map is not recognizeb by Sinclair Basic and so is unaffected by the commands New Run, Load Save and Clear The only way to destroy information stored in this section is to turn off the power

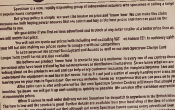
Of the 48K available only 16K can be used for writing a program and the screen display This is because of the way the machine is built Consequently no machine code can be run in the section above this maximum limit and, therefore, only variables can be stored in this section This limit is very rarely reached as it is usually the variables which take up the space

The instructions that come with the Ram pack are very clear including the above precautions and a guarantee

Summary
A very worthwhile addition to any ZX81 as it is cheap, light and easy to use, giving the programmar maximum use of the machine **SA**

NEXT WEEK: are review Haven Hardware's inverse video ZX81 module, plus the same company's keyboard repeat, and the book *Your Own Computer* by Michael Waite and Michael Pardee

spectrum



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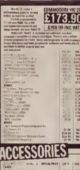
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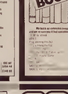
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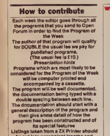
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Open Forum

Open Forum is for you to publish your programs and ideas
It is important that your programs are bug free before you send them in. We cannot test all of them
Contributions should be sent to: Popular Computing Weekly, Hobhouse Court,
19 Whitcomb Street, London WC2H 7HF



How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.
The author of that program will qualify for DOUBLE the usual fee we pay for published programs.
(The usual fee is £10.)

Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette.
The program will be well documented, the documentation being typed with a double spacing between each line.
The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.
Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing.
Please enclose a stamped, self-addressed envelope.

Wild Spectra

on Spectrum

This game is written for a 16K ZX Spectrum. Its object is to defend the six bases on the right hand side of the screen from the invaders who are walking along the paths from the left.

Each invader will walk from its starting position to the far right of the screen unless you stop it. You do this by moving on to the path it is coming along and then pressing the '1' key.

To move up, press the "O" key, to move down press "I". The game ends when all six bases are occupied by the invaders. Your score is then given — one point for each alien stopped, minus two for each one that gets through.

The letter 'I' in line 40 is a capital letter: make sure the capitals lock is on before running the program. The first set of quotes in line 30 should contain a space, a graphic 'p' and a graphic 'q'. The second

to next page

Wild Spectra by Bill Longley

PROGRAM OF THE WEEK

```
   1 REM
   2 REM   THE WILD SPECTRA
   3 REM  © Bill Longley 1982
   4 REM
   5 GO SUB 1000
  10 RANDOMIZE   PAPER 7: CLS
PAPER 6  OVER 0  LET W=0  LET D=
0  LET P=4  LET S=4
  15 FOR X=0 TO 20 STEP 4  PRINT
 AT X,0;  FOR N=1 TO 8  PRINT "
    ";  NEXT N  NEXT X
  20 FOR T=ABS INT (D-RND*10) TO
 29
  30 PRINT AT S,T; INK 1;"   "
PRINT AT S+1,T; INK 1;"   "  PRI
NT AT P,28; INK 3;"  "  PRINT AT
P+1,28;  INK 3;"  "
  40 LET V=4*(INKEY$="I" AND P<1
8)-4*(INKEY$="O" AND P>3)
  50 IF INKEY$="1" AND P=S THEN
GO TO 200
  60 BEEP .02,-15  BEEP .02,-17
  70 PRINT AT P,28;"  ";AT P+1,28
;"  "
  80 LET P=P+V
  90 NEXT T
  95 LET W=W-2
 100 IF POINT (248,168) AND POIN
T (248,136) AND POINT (248,104)
AND POINT (248,72) AND POINT (24
8,40) AND POINT (248,8) THEN GO
TO 230
 110 LET S=INT (RND*6)*4
 120 IF S>20 THEN LET S=4
 130 GO TO 20
 200 PRINT AT S,T;"   ";AT S+1,T
;"   "
 210 LET W=W+1
 215 IF D<25 THEN LET D=D+1
 220 GO TO 110
 230 PRINT AT 10,10; INK 3; PAPE
R 6; FLASH 1; BRIGHT 1;"SCORE="
W  INK 0  PAPER 7
 240 STOP
1000 FOR N=0 TO 7: READ A  POKE
USR "P"+N,A  NEXT N
1010 FOR N=0 TO 7  READ A  POKE
USR "Q"+N,A  NEXT N
1020 FOR N=0 TO 7: READ A  POKE
USR "R"+N,A  NEXT N
1030 FOR N=0 TO 7  READ A: POKE
USR "S"+N,A  NEXT N
1040 FOR N=0 TO 7  READ A  POKE
USR "T"+N,A  NEXT N
1050 FOR N=0 TO 7  READ A  POKE
USR "U"+N,A  NEXT N  RETURN
2000 DATA 0,0,15,15,63,63,51,51
2010 DATA 0,0,240,240,252,252,20
4,204
2020 DATA 63,63,15,15,12,12,48,4
8
2030 DATA 252,252,240,240,48,48,
12,12
2040 DATA 0,0,0,0,16,97,165,255
2050 DATA 165,97,16,0,0,0,0,0
```

from previous page

set contains a space a graphic "r and a graphic s The third contains a space and a graphic 't the fourth a space and a graphic u These are changed by the program into the invaders and the arrow representing you

The colours used in the game may be rather shocking to you I can t tell as I only have a black and white TV Feel free to change the Ink commands Good luck you ll need it My highest score is 285 no one else in my family has beaten 50

Starbleet

on Vic 20

The sky is falling! Or to be more accurate the stars are falling This game for the standard Vic20 involves blasting the stars to bits It leaves enough memory to increase the number of stars falling though not, regretably enough for user defined graphics

The tank is made from A,E S, all with the Commodore key depressed The colour/cursor codes are clr clear screen wht control + white red control + red cd cursor down

If required you could convert to joystick quite easily with the following Add POKE37154 127 to line 30 change P to 37151 In line 120 put P=110 instead of P=33 and in lines 140 and 150 instead of P$= put P=94

Finally change 130 to IF PEEK(37152)=119 THEN and leave the rest of the THEN loop the same Once this is done it should run with a joystick, but the poke code in 30 you added will need to be POKE37154 255 to allow normal key functions Put it in line 480

Starbleet
by Philip Murphy

```
5 REM***PHILIP MURPHY****
10 REM***STARBLAST***
20 GOTO500
30 POKE36879,111:POKE36878,15
40 CD$="[wht home 18cd]"
50 FOR I = 0 TO 88:POKE8098+I,160:POKE36818+I,(2 5+RND(1)):NEXT
60 FOR I = 1 TO 3:D=RND(1)*21+8164:POKED,209:NEXT
70 A=INT(RND(1)*21):C=A+30422:A=A+7702
80 POKEA,42:FOR I = 1 TO 50:NEXT:POKEA,32:G=255:R=INT(RND(1)*3)+21
90 A=A+R C=C+R POKEC,7:POKEA,42:POKE36874,G:FOR I = 1 TO 50:NEXTI:POKE36874,0
100 PRINTCD$TAB(T)"[space a e s space]":REM***PRESS FLAG KEY AND A,E,S***
110 P=PEEK 203):GETP$
120 IFP=33THEN T=T-1 IFT is less than 0THENT=0
130 IFP=34THEN T T+1:IFT is greater than 17THENT=17
140 IFP$= "B"ANDV=0THENV=1:F=8054+2+T.GOTO160
150 IFP$= % ANDV 1THENV=0 POKEF,32
160 PRINTCD$TAB(T)"[space a e s space]"
170 IFV=1THENPOKEF,93 FOR I = 1 TO 50 NEXTI POKEF,52 F=F-22:GOTO200
180 POKEA,32 A A+R:C=C+R IFA is greater than 8098THEN300
190 POKEA,42:POKEC,7:POKE36874,G FOR I   1 TO 40 NEXT:POKE36874,0:GOTO110
200 POKE36877,200:FOR I   1 TO 20:NEXT.IF F is less than 7702THENV=0:POKE36877,0:
GOTO110
210 IFPEEK(F)=42THEN FOR I   1 TO 300:POKEF,170 POKEF,42:POKE36877,255:NEXT:SC SC
+10 GOTO260
220 IFPEEK(F)=170THENPOKEF,32:GOTO60
230 POKE36877,0 POKEF,93 GOTO160
240 POKEF,32:POKE36877,0:V=0:GOTO70
300 IFPEEK(A)=160THENPOKEA,32 POKE36877,150:FOR I . 1 TO 50:NEXT:POKE36877,0:GOTO70
310 IFPEEK(A)=209THEN400
320 IFA is greater than8164ANDPEEK(A)=32THEN70
330 GOTO110
400 PRINT"[clr wht rvs on]YOU[rvs off] LET A STAR HIT"
410 PRINT"[cd]A POWER POD-IDIOT!!!"
420 PRINT"[cd]SCORE ",SC
430 IF SC is greater than HTHENH=SC
440 PRINT"[cd]HI-SCORE ",H
450 PRINT"[cd]AGAIN ?"
460 GETC$:IFC$=""THEN460
470 IFC$="Y"THENPRINT"[clr]":GOTO30
480 POKE198,0 END
500 POKE36879,31
510 PRINT"[clr red]BLAST A FALLING STAR"
520 PRINT"[2cd]THE STARS ARE FALLING"
530 PRINT [cd],AND ALL THAT IS"
540 PRINT [cd]PROTECTING EARTH'S"
550 PRINT"[cd]POWER PODS IS YOU'
560 PRINT"[cd](AND PRETTY MEAGRE "
570 PRINT"[cd]PROTECTION AT THAT!)"
580 PRINT"[cd]PRESS A KEY'
590 GETC$:IFC$-'"THEN590
600 PRINT"[clr]BLAST A FALLING STAR"
610 PRINT'[cd]YOU MUST SHOOT THE'
620 PRINT [cd]FALLING STARS YOU"
630 PRINT'[cd]HAVE A TANK, 3"
640 PRINT"[cd]LAYERS OF CHEAP"
650 PRINT'[cd]BRICKS OVER THE"
660 PRINT'[cd]POWER PODS.'
670 PRINT"[cd]Z=LEFT C.RIGHT B=FIRE"
680 PRINT"[cd]GOOD LUCK-YOU'LL"
690 PRINT"[cd]NEED IT!!'"
700 PRINT"[cd]HIT A KEY'
710 GETC$:IFC$-""THEN710
720 PRINT"[clr]'.GOTO30
```

Poker

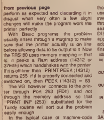
on Video Genie

One of the most attractive and widely advertised features of the Video Genie has been its ability to run the vast library of TRS 80 Level II software In most cases it is indeed true that the VG owner will experience no trouble at all in this respect, but there is one area in which he may find Tandy programs as sold absolutely useless and this is when the use of a lineprinter is involved

Nevertheless some programs such as Microsoft s EDTASM do operate the printer perfectly so one should always check the hardware carefully before blaming the program

However one too often hears of disappointed VG owners spending their hard-earned cash on software which refuses to

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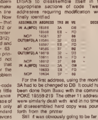
perform as expected and discarding it in disgust when very often a few slight changes will make the program work the printer perfectly

With Basic programs the problem usually arises through a mugtrap to make sure that the printer actually is on line before allowing data to be output to it. Now the TRS 80 uses memory mapping — that is it peeks a Ram address (14312 or 37E8h) which handshakes with the printer. If it is off line then PRINT PEEK (14312) returns 255. If it is properly connected and switched on, then PEEK (14312) = 63

The VG however connects to the printer through Port 253 (FDh) and not through the memory address so that PRINT INP (253) substituted for the Tandy routine will sort out the problem easily enough

In the typical case of machine-code programs however the matter is a little more complex. I was myself for instance rather disappointed in a recent purchase of the Cratt Disassembler DISAS. Not only did it output to tape in a non standard format and incorporate protective devices which made it difficult to examine but of course its printer I/O routine was quite useless to the Video Genie

It was necessary first of all to locate

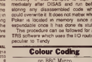


those parts of the program which made use of the memory mapped address. This involved patiently stepping a byte at a time through 4K of machine code with Z Bug in search of calls to 37E8h and then using DISAS to disassemble itself in the appropriate sections of code. Twelve addresses requiring modification were finally identified

ASSEMBLER	ADDRESS	TRS 80	VG	DECIMAL
IN A,(0FD)	18558	3A	DB	218
	18559	E8	FD	253
NOP	18581	37	00	0
OUT(0FD),A	18586	32	D3	211
	18587	E8	FD	253
NOP	18588	37	00	0
OUT(0FD),A	18610	32	D3	211
	18611	E8	FD	253
NOP	18612	37	00	0
IN A,(0FD)	18632	3A	DB	219
	18633	E8	FD	253
NOP	18634	37	00	0

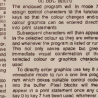
For the first address, using the monitor, 3A had to be changed to DB. It could have been done from Basic with the command POKE 18559 219. The other 11 addresses were similarly dealt with and in no time at all disassembled hard copy was pouring forth from the printer

Still it was obviously going to be far too tedious to poke in 12 bytes every time I wanted hard copy from DISAS so the next step was to put together Poker a machine-code routine that would do the job auto-



matically. It was dumped to tape immediately after DISAS and run before storing any disassembled code which could overwrite it. It does not matter where Poker is located in memory since it is expendable once it has done its stuff

This procedure can be followed for any TRS software which uses the I/O routines peculiar to Tandy



Colour Coding

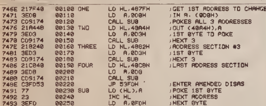
on BBC Micro

The enclosed program will in mode 7, assign control characters to the function keys so that the colour changes and/or colour graphics can be entered directly into print statements

Subsequent characters will then appear in the selected colour as they are entered and whenever the program is listed or run. This not only saves space but gives immediate visual confirmation of the selected colour or graphics character used

To directly enter graphics use key 8 in immediate mode to run a one line program which pokes suitable control codes into the buffer. Pixel blocks will then appear in a print statement once any of key 0 to key 7 has been used whenever a

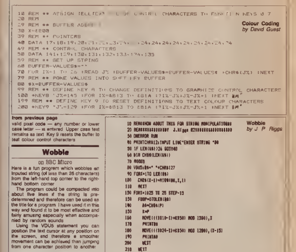
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```
746E 217F40    00100 OHE    LD HL,487FH     ;GET 1ST ADDRESS TO CHAHGE
7471 3ED8      00110        LD  A,0D8H      ;IH A. (0D8H)
7473 CD9174    00120        CALL SU8        ;POKES ALL 3 ADDRESSES
7476 21A448    00130 TWO    LD HL,48A4H     ;OUT (48A4H),A
7479 3ED3      00140        LD  A,0D3H      ;1ST 8YTE TO POKE
747B CD9174    00150        CALL SU8        ;HEXT 3
747E 218240    00160 THREE  LD NL,4882H     ;ADDRESS SECTION #3
7481 3ED3      00170        LD  A,0D3H      ;1ST 8YTE
7483 CD9174    00180        CALL SU8        ;HEXT 3
7486 21C048    00190 FOUR   LD HL,48C8N     ;LAST ADDRESS SECTION
7489 3ED8      00200        LD  A,0D8
748B CD9174    00210        CALL SU8
748E C3FD53    00220        JP 53FDH        ;EHTER AMENDED DISAS
7491 77        00230 SU8    LD (HL),A       ;POKE 1ST 8YTE
7492 23        00240        IHC HL          ;HEXT ADDRESS
7493 3EFD      00250        LD  A,0FDH      ;HEXT 8YTE
7495 77        00260        LD (HL),A       ;POKE IT
7496 23        00270        IHC HL          ;HEXT
7497 AF        00280        XOR A           ;SET A = 0
7498 77        00290        LD (HL),A       ;POKE 0
7499 C9        00300        RET
0000           00310        END
00000 TOTAL ERRORS
FOUR     7486
OHE      746E
SU8      7491
THREE    747E
TWO      7476
```

Poker
by Gordon Millington

Open Forum



Colour Coding
by David Guest

```
10 REM ** ASSIGN TELETEXT ... OF CONTROL CHARACTERS TO FUNCTION KEYS 0 7
20 REM
29 REM ** BUFFER ADDR
30 X=&B00
39 REM ** POINTERS
40 DATA 17,18,19,20,21,22,23,24, ,24,24,24,24,24,24,24,24,24
49 REM ** CONTROL CHARACTERS
50 DATA 141,129,130,131,132,133,134,135
59 REM ** SET UP STRING
60 BUFFER-VALUES$=""
70 FOR I%=1 TO 26 :READ J% :BUFFER-VALUES$=BUFFER-VALUES$ +CHR$(J%) :NEXT
79 REM ** POKE VALUES INTO SOFT KEY BUFFER
80 $X=BUFFER-VALUES$
99 REM ** DEFINE KEY 8 TO CHANGE DEFINITIONS TO GRAPHICS CONTROL CHARACTERS
100 *KEY8 "J%=145 :FOR I%=&B13 TO &B1A :?I%=J%:J%=J%+1 :NEXT |M"
199 REM ** DEFINE KEY 9 TO RESET DEFINITIONS TO TEXT COLOUR CHARACTERS
200 *KEY9 "J%=129 :FOR I%=&B13 TO &B1A :?I%=J%:J%=J%+1 :NEXT |M"
```

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valid pixel code — any number or lower case letter — is entered Upper case text remains as text Key 9 resets the buffer to text colour control characters

Wobble

on BBC Micro

Here is a fun program which wobbles an inputed string (of less than 26 characters) from the left-hand top corner to the right-hand bottom corner

The program could be compacted into about five lines if the string is predetermined and therefore can be used as the title for a program I have used it in this way and found it to be most effective and fairly amusing especially when accompanied by random sounds

Using the VDU5 statement you can position the text cursor at any position on the screen, and therefore a smoother movement can be achieved than jumping from one character position to another

Wobble
by J P Riggs

```
10 REM**HOW ABOUT THIS FOR STRING MANIPULATION**
20 REM***********BY J.Riggs ****************
50 ONERROR RUN
40 PRINTCHR$12:INPUT LINE"ENTER STRING "B$
50 IF LEN(B$)>26 GOTO40
60 DIM CH$(LEN(B$))
70 MODE0
80 VDU5:B$=" "+CHR$127
90 FORI=1TO LEN(B$)
100   CHR$(I-1)=MID$(B$,I,1)
110   NEXT
130 FORI=1025 TO 25 STEP-15
150   FORP=0TOLEN(B$)
140     A$=CH$(P)
150     K=P
160     MOVE(((1010-I)+K*50) MOD 1280),I
170     PRINTB$
180     MOVE(((1024-I)+K*50) MOD 1280),(I-15)
190     PRINTA$
200     NEXT
210   NEXT
220 RUN
```

Date Entry Routine

on ZX81

This program considers one item of data input — the date If the date requires a large number of date entries the input operation will be a chore The easier it is made the less the distraction and the less the possible error

The program uses the five column entry the three letter version — NOV27 — not the numeric — 27/11 The year is not considered it being assumed that this will be fairly constant and obvious

1 Date input will be by two or three keystrokes followed by newline
2. The program turns the first keystroke

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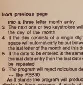
Date Entry Routine
by Vic Newton

```
  1 REM      DATE ENTRY ROUTINE

  3 REM      SINGLE STROKE ENTRY
  5 REM     FOR MONTH (3 LETTERS)
  7 REM           ******
  9 REM      FOR USER FRIENDLY
 11 REM         PROGRAMMES
 13 REM        AS IDIOT PROOF
 15 REM       AS IS REASONABLE
 17 REM           ******
 19 REM         VIC NEWTON
 21 REM           ******

 50 DIM D$(5)
 60 LET M$="OCTJANFEBMARAPRMAYJ
UNJULAUGSEPNOVDEC"
100 INPUT Z$
```

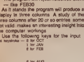
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into a three letter month entry

3 The next one or two keystrokes will be the day of the month
4 If the day consists of a single digit a space will automatically be put between the last letter of the month and this digit
5 If the date to be entered is the same as the last date entry then the last date can be repeated
6 The program will reject ridiculous dates — like FEB30

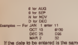
As it stands the program will produce a display in three columns. A study of the three columns after 20 or so entries, some not valid, makes an interesting insight into the computer workings.



Use the following keys for the input

1st keystroke — 0 for OCT
1 for JAN
2 for FEB

8 for AUG
9 for SEP
N for NOV
D for DEC



Examples — For JAN 1 enter 11
OCT 13 0130
DEC 25 D25
MAR 2 32

If the date to be entered is the same as the previous entry then enter RR for a repeat. The double R is to make reasonably sure that the entry is deliberate and not a miskey.

This may seem a waste of memory just for a date entry but anything that makes programming easier is worth while. If the memory is available why not use it.

```
 102 PRINT TAB 2,Z$,
 110 IF Z$="RR" THEN GOTO 380
 120 IF LEN Z$<2 OR LEN Z$>3 THE
N GOTO 100
 130 LET Z$="0"+Z$
 140 IF Z$(2)="N" THEN LET Z$(1
TO 2)="10"
 150 IF Z$(2)="D" THEN LET Z$(1
TO 2)="11"
 160 FOR J=1 TO LEN Z$
 170 IF CODE Z$(J)<28 OR CODE Z$
(J)>37 THEN GOTO 100
 180 NEXT J
 200 LET M=VAL Z$(1 TO 2)
 210 LET D=VAL Z$(3 TO )
 230 IF D>30 AND (M=4 OR M=6 OR
M=9 OR M=10) THEN GOTO 100
 240 IF D>29 AND M=2 THEN GOTO 1
00
 290 IF Z$(3)="0" OR D>31 THEN G
OTO 100
 300 PRINT TAB 12,Z$,
 310 FOR J=0 TO 11
 320 IF J=M THEN LET D$(1 TO 3)=
M$(3*J+1 TO 3*J+3)
 330 NEXT J
 340 LET D$(4 TO )=Z$(3 TO )
 347 REM  TO PUSH EMPTY SPACES
 349 REM   FROM COLUMN 5 TO 4
 350 IF D$(5)=D$(4) THEN GOTO 36
0
 360 IF D$(5)=" " THEN LET D$(5)
=D$(4)
 370 IF D$(5)=D$(4) THEN LET D$(
4)=" "
 380 PRINT TAB 23;D$
 390 GOTO 100
```

```
11        011      JAN 1           01      001     OCT 1
123       0123     JAN23           031     0031    OCT31
011       0211     FEB11           N8      108     NOV 8
020                                N22     1022    NOV22
F                                  N31
RR                 FEB11           RR              NOV22
229       0229     FEB29           08      112     DEC 8
32        032      MAR 2           D08     1108    DEC08
41        041      APR 1           4
401                                25      025     FEB 5
410       0410     APR10           1342
RUBBISH                            111     0111    JAN11
511       0511     MAY11           1111
530                                RR              JAN11
531       0531     MAY31           25      025     FEB 5
631                                RR              FEB 5
630       0630     JUN30           RR              FEB 5
RR                 JUN30           RR              FEB 5
72        072      JUL 2           329     0329    MAR29
731       0731     JUL31           331     0331    MAR31
RR                 JUL31           621     0621    JUN21
100       0120     JAN20           RR              JUN21
```

Reverse

on BBC Micro

The object of this popular game is to sort a string of randomly-organised digits into the string 123456789. The only way you are allowed to do this is by reversing the first n digits.

The special feature of this program is that it accomplishes each reversal by physically shuffling individual digits around the screen into their new positions.

As soon as you have succeeded the display flashes in excitement and congratulation. The structure of the program is:

(a) Display title screen (PROCtitle)
(b) Display playing instructions if requested (PROCinstn)
(c) Generate random string of 9 digits
(d) Reverse the first 'n digits (PROCmove and PROCrev)
(e) Test for successful completion
(f) Reward success by flashing the completed string (PROCdunit)

Although straightforward in construction the program illustrates the use of various VDU commands.

Reverse
by Mike Berry

```
10 REM "REVERSE" by Mike Berry
20 MODE 5
30 VDU 5
40 PROCtitle
50 MODE 7
60 PRINT PRINT
70 INPUT "Would you like instructions",Z$
80 IF LEFT$(Z$,1)="Y" THEN PROCinstn
90 DIM A(9)
100 DIM B(9)
110 FOR I=1 TO 9
120 A(I)=0 B(I)=0
130 NEXT I
140 MODE 5
150 VDU 31,5,16
160 FOR I=1 TO 9
170 DIGIT=RND(9)
180 IF A(DIGIT)=0 THEN A(DIGIT)=1 ELSE GOTO 170
190 NEXT I
200 FOR J=1 TO 9
210 PRINT, A(J)
220 NEXT J
230 VDU 31 5,31
240 PRINT, "DIGITS"
250 VDU 5
260 PROCmove
270 X=0
280 FOR I=1 TO 9
290 IF A(I)<>I THEN X=1
300 NEXT I
310 IF X=0 THEN PROCdunit ELSE GOTO 260
320 MODE 7
330 VDU 31,0,31
340 INPUT "Would you like another game",Z$
350 IF LEFT$(Z$,1)="Y" GOTO 130
360 CLS VDU 31,3,15
370 PRINT "CHEERIO, THEN"
380 I=TIME+500 REPEATUNTIL I=TIME
390 MODE 7
400 VDU 14
410 END
420 DEF PROCtitle
430 VDU 31 7,16
440 PRINT "REVERSE"
450 T=TIME+500 REPEATUNTIL T=TIME
460 ENDPROC
470 DEF PROCinstn
480 CLS
490 PRINT
500 PRINT' "REVERSE"''      "' "In this game, the computer will think upa
random 9-digit number, in which every"'"digit appears only once "
```

```
510 PRINT'"The object of the game is to re-arrange"'"the digits into the
 number '123456789',"'"with as few moves as possible."
520 PRINT'"To make a move, enter a single digit,"'"in the range 1 to 9.
 the computer will"'"reverse that number of digits, counting from the le
ft."
530 PRINT:PRINT "WHEN YOU ARE READY TO START, PRESS"
540 INPUT "RETURN"Y$
550 ENDPROC
560 DEF PROCmove
570 VDU 31,8,30 VDU 127 VDU 31,6,30
580 INPUT ,N
590 IF N<2 N=2:IF N>9 N=9
600 FOR K=2 TO N
610 FOR L=14 TO (13+K)
620 VDU 31,(5+K),L
630 VDU 127
640 VDU 31,(4+K),(L+1)
650 PRINT,A(K)
660 T=TIME+15 REPEATUNTIL T=TIME
670 NEXT L
680 NEXT K
690 FOR K=2 TO N
700 FOR L=0 TO (K-2)
710 VDU 31,(5+K-L),(14+K)
720 VDU 127
730 VDU 8
740 PRINT,A(K)
750 T=TIME+15.REPEATUNTIL T=TIME
760 NEXT L
770 NEXT K
780 FOR K=1 TO (N-1)
790 VDU 31,6,(14+K)
800 FOR L=1 TO (N-K)
810 VDU 127
820 VDU 31,(5+L),(14+K)
830 PRINT,A(K),
840 T=TIME+15 REPEATUNTIL T=TIME
850 NEXT L
860 NEXT K
870 PROCrev
880 FOR K=1 TO (N-1)
890 FOR L=1 TO (N-K)
900 VDU 31,(5+K),(16+N-K-L)
910 VDU 127
920 VDU 31,(4+K),(15+N-K-L)
930 PRINT,A(K),
940 T=TIME+15 REPEATUNTIL T=TIME
950 NEXT L
960 NEXT K
970 ENDPROC
980 DEF PROCrev
990 P=N
1000 FOR J=1 TO N
1010 B(J)=A(P)
1020 P=P-1
1030 NEXT J
1040 FOR I=1 TO N
1050 A(I)=B(I)
1060 NEXT I
1070 ENDPROC
1080 DEF PROCdunit
1090 VDU 31,9,30
1100 FOR I=1 TO 9
1110 VDU 127
1120 NEXT I
1130 VDU 19,3,8,0,0,0
1140 T=TIME+1000 REPEATUNTIL T=TIME
1150 VDU 20
1160 ENDPROC
```

Win the great new ZX Spectrum

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2. *Closing date for entries is August 16 1982*
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4

The case for upper and lower case . . .

Philip Barnard explains how to compile your own character set for the ZX81

This program is designed to enable you to compile your own character set for the 4K or 16K ZX81 It includes a self-editing facility and a machine code routine to *Lprint* the characters on a ZX printer

The program can be used to create an upper and lower case character set, simulating the operation of a typewriter Alternatively, you could use the program to *Lprint* chemical formulae and equations

As the routine is compiled and *Saved* in a string array rather than a line 1 Rem statement it is necessary to use the command *Goto* when operating the program Do not use the command *Run*

Character Set

This is the first and longest section of the program It requires 512 bytes of memory because each of the 64 characters is defined by eight numbers Program A1 is used to make the necessary entries in decimal form Using the convention white pixel (or picture element) = 0 and black pixel = 1, each character can be built up from the eight numbers written in 8-bit binary form as used by the computer

Program A2 can be used to create new characters directly from these 8-bit numbers entered as B$ in line 80 The decimal equivalent is calculated by line 100 and printed on the VDU Characters can be conveniently designed on 8×8 graph-paper grids (Use in *Fast* mode)

The *Lprint* routine which takes up 132 bytes is taken directly from the Sinclair 8K Rom using program B It consists of the *Copy* routine minus the first eight bytes which read the 22 lines of characters from the display file into the printer buffer for line printing — this function will now be performed by the *Edit* routine One byte has to be changed to point at the address of the new character set The final part of the *Lprint* routine also clears the printer buffer ready for the next line of characters

The *Edit* routine which uses 81 bytes, is entered by means of program C Its function is to examine text to be *Lprinted* in lines of 32 characters to determine whether a word will be split between different lines When a word is found to overlap it is taken over to the next line

After returning to the *Edit* routine, a test is made to determine whether any more text remains to be printed The addresses of the last character in the Rem statement and the last character printed are saved and compared When these two addresses are identical a Return is made to the Basic program

To compile the complete routine *Clear* the memory and enter *Dim A$(725)* It is most important to have the dimensioned array as the first entry in the variables store in Ram, because the machine code routine used to copy its contents safely above Ramtop assumes this to be the case

Next key in program A1 being careful to use *Goto* 10 The computer will ask for eight entries for each of the 63 characters Enter the eight numbers specified for each character in the list provided

You might like to *Save* the program at this point Entering S instead of *Newline* will stop the program after any particular character has been entered But, remember to re-start with *Goto* 120

Mistakes can be rectified by stopping the program followed by *Goto* 20 Program A2 can be used to change selected characters to the user's own design

To use the *Lprint* routine, replace program A1 with program B deleting lines 40 to 130 Operate using *Goto* 10 After this routine has been copied from Rom, enter as a direct command *Let A$(569) = Chr$ 62* This is the instruction which points the routine at the new address for the character set (31744 for 16K Ram or 19456 for 4K Ram)

Replace program B

Next enter program C thereby replacing program B Again operate using *Goto* 10 Enter the numbers for this section in the order listed for each element of the array The screen will print and scroll up the number of the A$ array element together with the value you have entered for each one When this section is complete you can *Save* the program

The whole routine has been entered into the A$ array and we must now write a short machine code routine to copy its contents above Ramtop Key in program D to replace program C taking care to have the correct number of characters (17) in the line 1 Rem statement which is used to hold the m/c routine Operate program D with *Goto* 10 and enter the values as given in the list, which are *Poked* in turn into line 1 Then delete lines 10 to 60, but retaining line 1 and enter program E

Due to the fact that there are two versions of the ZX81 8K Rom in circulation which have some subroutines located at different addresses it is necessary to include line 5 in the final program E so that it will work on computers containing either Rom

Save program E together with the array holding the routine using the command *Goto* 2 When *Saved* the line 1 machine code routine in program E sets Ramtop automatically to reserve 1K of memory and copy the contents of the A$ array above the newly set Ramtop *Peek* 16389 returns 76 and 124 for 4K and 16K Ram respectively Line 6 prints the letters OK on the tv screen indicating that the routine has been successfully located

This process will now be repeated whenever you *Load* program E so that the routine is safely above Ramtop ready for action. You need only remember before *Save* or *Load* that Ramtop should be at the address set by the computer at power-up *Peek* 16389 should return 80 or 128 for 4K and 16K Ram respectively

Once you have the final program working successfully it can be tested as follows First New and Basic program E. Then enter

```
10 LET A = 32368
20 RAND USR A
30 REM (GRAPHIC SHIFT T)HIS IS A TEST RUN OF
   THE UPPER AND LOWER CASE CHARACTER
   SET AND A TEST OF THE AUTOMATIC LINE
   EDITING FACILITY
```

Do not be too concerned by the way it prints on the screen The first character in the Rem statement should be the graphic symbol shown on key 'T' The command Run should produce the following response from the printer

```
This is a test run of the upper
and lower case character set,
and a test of the automatic line
editing facility
```

Experiment with longer Rem statements and check the functions of the new keyboard layout for upper case letters Any number of Rem statements can be used within the limits of available memory provided that they are each preceded by a *Usr* call to the routine

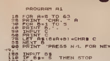
Changes required for 4K Ram operation

```
Program B  LET A$(569) = CHR$ 38
Program C  LET A$(471) = CHR$ 78
           LET A$(716) = CHR$ 78
Program E. LET A = 24100
For RAND USR A, LET A = 20180 (when printing text)
```

Z80 op-codes for program E machine code

58 5 64	LD A,(16389)	
214 4	SUB A, 4	
50 5 64	LD (16389), A	Lower current Ramtop by 4 × 256 bytes
87	LD D A	
30 0	LD E, 0	Let DE = first address above Ramtop
42, 16 64	LD HL, (VARS)	
1 6 0	LD BC 6 d	
9	ADD HL, BC	Let HL = start of A$ array
1, 213 2	LD BC 725 d	Let BC = no of bytes in A$
237 176	LDIR	Block load A$ above Ramtop
201	RET	Return to Basic program

Programming



PROGRAM A1

```
10 FOR A=0 TO 63
20 PRINT "CHR. "; A
30 FOR B=1 TO 5
40 PRINT B,". "
50 INPUT C
60 PRINT C
70 LET A$(8*A+B)=CHR$ C
80 NEXT B
90 PRINT "PRESS N/L FOR NEXT C
HR."
100 INPUT B$
110 IF B$="S" THEN STOP
120 CLS
130 NEXT A
```

ENTRIES FOR PROGRAM A1

LISTING FOR CHARACTERS 0 TO 63

CHR	1	2	3	4	5	6	7	8
0	0	0	0	0	0	0	0	0
1	0	126	64	124	64	64	64	0
2	0	60	66	64	78	66	60	0
3	0	66	66	66	66	90	36	0
4	0	66	66	126	66	66	66	0
5	0	124	66	66	124	66	66	0
6	0	254	16	16	16	16	16	0
7	0	126	64	124	64	64	126	0
8	0	60	66	66	126	66	66	0
9	0	120	68	66	66	68	120	0
10	0	60	64	60	2	66	60	0
11	0	124	66	66	124	64	64	0
12	0	60	66	4	8	0	8	0
13	0	66	66	66	66	66	60	0
14	0	126	4	8	16	32	126	0
15	0	60	66	64	64	66	60	0
16	0	62	6	0	8	8	62	0
17	0	60	66	66	66	66	60	0
18	0	66	102	90	66	66	66	0
19	0	66	98	82	74	70	66	0
20	0	64	64	64	64	64	126	0
21	0	66	72	112	72	68	66	0
22	0	2	2	2	66	66	60	0
23	0	124	66	124	66	66	124	0
24	0	66	66	66	66	36	24	0
25	0	130	66	40	16	16	16	0
26	0	0	0	0	0	0	0	16
27	0	0	0	0	0	24	24	0
28	0	60	66	66	82	74	60	0
29	0	0	0	0	0	0	0	0
30	0	60	66	2	60	64	126	0
31	0	60	66	12	2	66	60	0
32	0	0	24	40	72	126	8	0
33	0	126	64	124	2	66	60	0
34	0	60	64	124	66	66	60	0
35	0	126	2	4	8	16	16	0
36	0	60	66	60	66	66	60	0
37	0	60	66	66	62	2	60	0
38	0	0	66	4	60	66	58	0
39	0	64	64	88	100	100	88	0
40	0	0	60	64	64	64	60	0
41	0	2	2	26	38	38	26	0
42	0	0	56	68	120	64	60	0
43	0	0	28	16	124	16	16	0
44	0	0	28	34	34	30	2	28
45	0	64	64	88	100	68	68	0
46	0	8	0	8	8	8	28	0
47	0	0	0	8	8	8	72	48
48	0	64	72	80	96	80	72	0
49	0	48	16	16	16	16	24	0
50	0	0	82	109	73	73	73	0
51	0	0	88	100	68	68	68	0
52	0	0	56	68	68	68	56	0
53	0	0	88	100	100	88	64	64
54	0	0	26	38	38	26	2	2
55	0	0	88	100	64	64	64	0
56	0	0	60	64	56	4	120	0
57	0	16	16	124	16	20	8	0
58	0	0	68	68	68	68	58	0
59	0	0	68	68	40	40	16	0
60	0	0	65	73	73	73	54	0
61	0	0	68	40	16	40	68	0
62	0	0	34	34	38	26	2	28
63	0	0	126	4	8	16	126	0

PROGRAM A2

```
10 CLS
20 PRINT "ENTER CHARACTER CODE"
30 INPUT A
40 PRINT A
50 FOR B=1 TO 8
60 PRINT B,".
70 LET C=0
80 INPUT B$
90 FOR D=1 TO 8
100 LET C=C+VAL B$(D)*2**(8-D)
110 NEXT D
120 PRINT C
130 LET A$(8*A+B)=CHR$ C
140 NEXT B
150 PRINT "PRESS N/L FOR NEXT C
HR."
160 INPUT C$
170 IF C$="S" THEN STOP
180 GOTO 10
```

PROGRAM B

```
10 FOR A=513 TO 644
20 LET A$(A)=CHR$ PEEK (1648+A)
30 NEXT A
```

PROGRAM C

```
10 FOR A=645 TO 725
20 INPUT B
30 LET A$(A)=CHR$ B
40 SCROLL
50 PRINT A,,CODE A$(A)
60 NEXT A
```

ENTRIES FOR PROGRAM C

A$	CODE	A$	CODE	A$	CODE
645	42	672	236	699	43
646	41	673	40	700	17
647	64	674	19	701	59
648	35	675	35	702	64
649	35	676	62	703	235
650	76	677	0	704	9
651	35	678	190	705	235
652	75	679	40	706	237
653	11	680	17	707	184
654	11	681	43	708	205
655	35	682	11	709	0
656	64	683	237	710	126
657	93	684	165	711	209
658	9	685	35	712	225
659	229	686	40	713	167
660	235	687	9	714	237
661	1	688	43	715	62
662	32	689	43	716	250
663	0	690	1	717	25
664	3	691	32	718	24
665	235	692	0	719	195
666	167	693	9	720	126
667	237	694	229	721	129
668	62	695	24	722	79
669	250	696	3	723	25
670	207	697	3	724	24
671	126	698	229	725	224

PROGRAM D

```
1 REM 12345678901234567890123
10 FOR A=16514 TO 16537
20 INPUT B
30 POKE A,B
40 SCROLL
50 PRINT A,PEEK A
60 NEXT A
```

ENTRIES FOR PROGRAM D

16514	58	16522	87	16530	0
16515	5	16523	30	16531	9
16516	64	16524	0	16532	1
16517	214	16525	42	16533	213
16518	4	16526	16	16534	2
16519	58	16527	64	16535	237
16520	5	16528	1	16536	176
16521	54	16529	6	16537	201

PROGRAM E

```
1 REM RNDCHR$ AND?2 E(RN
 STR$ GOSUB TAN
2 SAVE "LAND"
3 RAND USR 16514
4 LET A=32385
5 POKE A-116,PEEK 2177
6 PRINT CHR$ (PEEK A+15),CHR$
PEEK (A-101)
```

Peek & poke

Peek your problems to our address. Ian Beardsmore will poke back an answer.

JUST TRYING TO MAKE THE GRADE

Mr P O'Brian of Church Street, Caernarvon writes

Q I have just received the ZX80 Upgrade kit' from Compshop Before I alter my ZX80 with 8K Rom, have you reviewed the kit and could you assist me with a few problems — 1 What extras have I now got? 2 Do I have Slow mode? 3 Please can you tell me how to number the pins (which is number one)? 4 Does this kit now make my ZX80 a ZX81?

A *We have not reviewed the kit, but I hope I can help you Apart from a modification to 23b of the Output port you now have the complete ZX81 The hardware modification above necessitates a cut in the track underneath pin 20 A 680 ohms resistor then needs to be wired from pin 20, to 23b on the edge connector This is the Not Chip Select and it turns off the Rom if high This can be quite a tricky job if you are not used to soldering and it is not often that 23b is needed*

As for identifying a chip, if you look down onto the top of it (ie with the pins down) and the D cut-out nearest to you then pin one will be the first pin on the right The pins are numbered consecutively along the right 1-7 At the end they cross over and work from 8-14 back down towards you All chips are numbered in this horseshoe shape Thus pin 1 is opposite pin 14 Pin 13 is opposite pin 2 and so on

WHAT'S THE WORD ON TELETEXT?

Mr S Stratford of Chittock Mead, Basildon, Essex writes.

Q As I intend to buy a ZX Spectrum I would like to know if it is possible to decode Ceefax and Oracle via the computer and certain hardware This would help increase the uses of a home computer

A *This is certainly not possible at the moment, as no one has had a Spectrum long enough to look at the feasibility of such a project While a Prestel adaptor has now been developed for the ZX81 (see Popular Computing Weekly May 6) the operating systems are very different I doubt very much whether it will even be possible let alone feasible to develop such an adaptor for the Spectrum*

HAVE I BECOME A CRASHING BORE?

Keith Hurran of St Day in Cornwall asks

Q I have a ZX81 in a Crofton keyboard Attached to this I have a Quicksilva motherboard, with a character board and sound board and a Sinclair Ram pack and printer To aid Loading I have a GM Harris cassette filter which is powered by the Sinclair 1 2 amp power supply

My problem is, that when all the accessories are powered up or just connected, then any mains appliance turned on crashes or corrupts the program Even using the cassette player or a battery powered amplifier for the sound board will cause a program crash So far my only solution has been to disconnect any two of the accessories then I have no problems I have tried to change the configuration of the boards, cleaning the connections but to no avail

The Sinclair power pack is isolated by a mains suppressor which has improved things slightly but not much It can be very frustrating to spend four or five hours creating a program using all the boards and the printer and then being unable to use the cassette even on batteries Or else someone in the house turns on a light or opens the fridge door Please can you help?

A *Essentially the problem is lack of power to your accessories The QS mother board was designed to take a 16K Ram pack and any two other accessories Count and you will see that you are using three*

The printer especially uses a lot of current and this could well be the major source of your troubles Remember the Ram is dynamic and the REFSH is used to top up the memory with current The smallest fluctuation or interruption of power can wipe out some or all of the memory by quite simply denying it power

Any appliance when turned on causes an initial surge in the demand for power Thus, your system is momentarily denied the full power it needs and crashes

The only solution I can think of, assuming that you want to keep all the peripherals on line, is to increase the power supply to two or even three amps including a regulator in the power line at the same time

As for the cassette causing problems even when working on batteries I cannot give you a definite answer One possibility is that you are working so close to maximum tolerance that even the Saving signal is demanding more power than you have available

IT DOESN'T MAKE AN ATOM OF SENSE

David Muir of Ailsa Road, Saltcoats, Ayrshire writes

Q I have an Acorn Atom fully expanded to 12K Ram and 12K Rom, plus a tool box Rom of 4K Recently, I bought a colour card but I have no instructions on how to fit it Please could you tell me how to do this

Also I would like to know if I could fit a 10ma LED in parallel with the power supply input For the colour card to work I have had to buy a 5v, 3-amp stabilised power supply Would this new supply allow me to fit an LED?

A *There are two questions here Firstly as regards the colour card I am not thoroughly familiar with it Even if I was I would still hesitate to give you instructions, in case I contravened the manufacturers recommended practice, thus voiding any guarantee in the event of an accident In a situation like this you really have little recourse other than to go back to the manufacturers and ask them for the instructions that should be included with the kit*

As for the LED I can see no problems In effect you have 300ma available so in this case 10 of them should not be missed if they are used on an LED However do not forget that you will need a resistor to stop the other 290 ma trying to get through the LED, which would leave it well and truly blown

REVING UP FOR A REVERSE THRUST

D Whittaker of Poplar Court, Salford writes.

Q Please can you tell me how to attain the inverse graphics characters on a Vic20? I am particularly baffled by lines 12150 and 12240 of S Mahmood's *Spacefighter*, listed in the May 27 issue of *Popular Computing Weekly* I have noticed it in several programs and have substituted it with a character which represents a colour of my own choice, as this is what I believed it to be The character is an oblique but pointing in the opposite way to normal, and is inverse'

A *I think the problem partly stems from the Vic using Reverse to mean Inverse You will see on keys 9 and 0* Revs on *and* Revs off *respectively These two keys should give you inverse graphics, if used in conjunction with* Ctrl

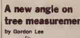
When you have opened your Print *statement use* Ctrl *and* Revs on *at the same time There will be no apparent difference in the curser except that all subsequent entries will be in inverse graphics until* Ctrl Revs off *are used together If you get an inverse R when entering* Ctrl Revs on *then delete it and start again*

The graphic character in Spacefighter *is obtained by* Shift/M *The code of this graphic symbol is 77 If you add 128, you get the code of the inverse character Thus, you can also poke it into a screen location, peek it, or use the function* Chrs 205

Competitions

A new angle on tree measurement

by Gordon Lee



The top of the tree has an elevation of 20° for an observer standing 100ft away. How high is the tree? Using trigonometry we can say

Height = 100 × tan 20°

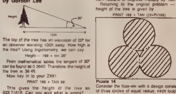
From mathematical tables the tangent of 20° can be found as 0.3640. Therefore the height of the tree is 36.4ft.

Now key in to your ZX81

```
PRINT 100 * TAN 20
```

This gives the height of the tree as 223.7161ft. Can you spot what is wrong?

The problem is that the angle should be entered not in degrees, but in *radians*. In everyday use degrees are nearly always used for the measurement of angles and it is not surprising that the radian is a relatively unfamiliar unit. Some computers will automatically convert from degrees to radians but the ZX81 does not.

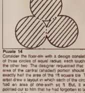


The conversion is not difficult but first, what is a radian? If we draw a circle and measure off a distance the length of the radius along the circumference then the angle subtended by this arc at the centre is equal to one radian.

Since the angle subtended at the centre of a circle is 360°, one radian is then equal, in degrees, to 360 divided by the numbers of times the radius can be measured around the circumference. This works out as 180/π degrees or 57.2957°. Consequently, to convert from degrees to radians multiply by π/180; to convert from radians to degrees multiply by 180/π.

Returning to the original problem — the height of the tree is given by

```
PRINT 100 * TAN (20*PI/180)
```



Puzzle 14

Consider the floor-tile with a design consisting of three circles of equal radius, each touching the other two. The designer requested that the area of the central (shaded) portion should be exactly half the area of the 1ft square tile. The artist drew a layout in which each of the circles had an area of one-sixth sq ft. But, it was pointed out to him that he had forgotten to take account of the small central portion which lies between the three circles.

What is the correct radius for the circles?

The closing date for the competition is Tuesday August 3.

Solution to Puzzle No. 10

The sets of four digits (all different) can be generated in four For/Next loops. These can then be combined in pairs, the product of the two pairs evaluated and, by entering the relevant values into strings the digits can be checked off against each other.

```
10 FOR A = 1 TO 9
20 FOR B = 0 TO 9
30 IF B = A THEN GOTO 240
40 FOR C = 1 TO 9
50 IF C = A OR C = B THEN GOTO 230
60 FOR D = 0 TO 9
70 IF D = C OR D = B OR D = A THEN GOTO 230
80 LET E = 10*A + B
90 LET F = 10*C + D
100 LET G = E*F
110 LET G$ = STR$ G
120 IF LEN G$ <> 4 THEN GOTO 230
130 LET A$ = STR$ (E*100 + F)
140 FOR N = 1 TO 4
150 LET T = 0
160 FOR M = 1 TO 4
170 IF A$(N) = G$(M) THEN LET T = T + 1
180 NEXT M
190 IF T <> 1 THEN GOTO 230
200 NEXT N
210 PRINT A$(1 TO 2);" X ";A$(3 TO 4);" = ";G$
220 NEXT D C B A
```

The answer is that there are six such sets of numbers possible: 15 × 93 = 1395, 21 × 60 = 1260, 21 × 87 = 1827, 27 × 81 = 2187, 30 × 51 = 1530 and 35 × 41 = 1435.

Winner of Puzzle No. 10

The winner is P Atkinson, Park Grove, Norton, Malton, North Yorkshire, who receives £10.

Solution to Crossword No. 10

Across 3 Ice, 8 Roast, 9 Vinegar, 10 Nice, 11 Analogue, 13 Hidden, 14 Aspirin, 17 Romantic, 18 Ants, 21 Excused, 22 Ramps, 23 Sum.
Down 1 French fries, 2 Rancid, 3 Its, 4 Event, 5 Analyst, 6 Agog, 7 Free and easy, 12 Newness, 15 Rename, 16 Winds, 19 Mice, 20 Arm.

Winner of Crossword No. 10

The winner is D J Robinson, Bare Lane, Morecambe, Lancs, who receives £10.

CITIZEN PAIN

BY DAVID IRELAND and JAMES MACDONALD



New ZX81 Software from Sinclair.

A whole new range of software for the Sinclair ZX81 Personal Computer is now available – direct from Sinclair Produced by ICL and Psion, these really excellent cassettes cover games education and business/household management

Some of the more elaborate programs can only be run on a ZX81 augmented by the ZX 16K RAM pack (The description of each cassette makes it clear what hardware is required.) The RAM pack provides 16-times more memory in one complete module and simply plugs into the rear of a ZX81 And the price has just been dramatically reduced to only £29 95

The Sinclair *ZX Printer* offer full alphanumerics and highly sophisticated graphics A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions So now you can print out your results for a permanent record The ZX Printer plugs into the rear of your ZX81 and you can connect a RAM pack as well

Games

Cassette G1: Super Programs 1 (ICL)
Hardware required – ZX81
Price – £4 95
Programs – Invasion from Jupiter Skittles Magic Square Doodle Kim Liquid Capacity
Description – Five games programs plus easy conversion between pints/gallons and litres

Cassette G2: Super Programs 2 (ICL)
Hardware required – ZX81
Price – £4 95
Programs – Rings around Saturn Secret Code Mindboggling Silhouette Memory Test Metric conversion
Description Five games plus easy conversion between inches/feet/yards and centimetres/metres

Cassette G3: Super Programs 6 (ICL)
Hardware required – ZX81
Price – £4 95
Programs – Train Race Challenge Secret Message Mind that Meteor Character Doodle Currency Conversion
Description – Fives games plus currency conversion at will – for example, dollars to pounds

Cassette G4: Super Programs 4 (ICL)
Hardware required – ZX81
Price – £4 95
Programs – Down Under Submarines Doodling with Graphics The Invisible Invader Reaction Petrol
Description – Five games plus easy conversion between miles per gallon and European fuel consumption figures.

Cassette G5 Super Programs 6 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £4 95
Programs – Martian Knock Out. Graffiti Find the Mate Labyrinth Drop a Brick Continental
Description – Five games plus easy conversion between English and continental dress sizes

Cassette G6: Super Programs 6 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £4 95
Programs – Galactic Invasion, Journey Into Danger Create Nine Hole Golf Solitaire Daylight Robbery
Description – Six games making full use of the ZX81's moving graphics capability

Cassette G7: Super Programs 7 (ICL)
Hardware required – ZX81
Price – £4 95
Programs – Racetrack Chase NIM Tower of Hanoi Docking the Spaceship Golf
Description – Six games including the fascinating Tower of Hanoi problem

Cassette G8: Super Programs 6 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £4 95
Programs – Star Trail (plus blank tape on side 2)
Description – Can you, as Captain Church of the UK spaceship Endeavour, rid the galaxy of the Klingon menace?

Cassette G9: Biorhythms (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6 95
Programs – What are Biorhythms? Your Biohythms
Description – When will you be at your peak (and trough) physically emotionally and intellectually?

Cassette G10 Backgammon (Psion)
Hardware required – ZX81 + 16K RAM
Price – £5 95
Programs – Backgammon Dice
Description – A great program using fast and efficient machine code, with graphics board, rolling dice and doubling dice The dice program can be used for any dice game

Cassette G11: Chess (Psion)
Hardware required – ZX81 + 16K RAM
Price – £6 95
Programs – Chess Chess Clock.
Description – Fast, efficient machine code a graphic display of the board and pieces, plus six levels of ability combine to make this one of the best chess programs available The Chess Clock program can be used at any time

Cassette G12: Fantasy Games (Psion)
Hardware required – ZX81 (or ZX80 with 8K BASIC ROM) + 16K RAM
Price – £4 75
Programs – Perilous Swamp Sorcerer's Island
Description – Perilous Swamp rescue a beautiful princess from the evil wizard Sorcerer's Island you're marooned To escape you'll probably need the help of the Grand Sorcerer

Cassette G13: Space Raiders and Bomber (Psion)
Hardware required – ZX81 + 16K RAM
Price – £3 95
Programs – Space Raiders Bomber
Description – Space Raiders is the ZX81 version of the popular pub game Bomber destroy a city before you hit a sky-scraper

Cassette G14: Flight Simulation (Psio
Hardware required – ZX81 + 16K RAM
Price – £5 95
Program – Flight Simulation (plus blank tape on side 2)
Description – Simulates a highly manoeuvrable light aircraft with full controls instrumentation a view through the cockpit window and navigational aids Happy landings!

Education

Cassette E1 Fun to Learn series – English Literature 1 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6 95
Programs – Novelists Authors
Description – Who wrote 'Robinson Crusoe'? Which novelist do you associate with Father Brown?

Cassette E2. Fun to Learn series – English Literature 2 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6 95
Programs – Poets Playwrights Modern Authors
Description – Who wrote 'Song of the Shirt'? Which playwright also played cricket for England?



Cassette E3 Fun to Learn series – Geography 1 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6.95
Programs – Towns in England and Wales. Countries and Capitals of Europe.
Description – The computer shows you a map and a list of towns. You locate the towns correctly. Or the computer challenges you to name a pinpointed location.

Cassette E4: Fun to Learn series – History 1 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6.95
Programs – Events in British History. British Monarchs.
Description – From 1066 to 1981, find out when important events occurred. Recognise monarchs in an identity parade.

Cassette E5: Fun to Learn series – Mathematics 1 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6.95
Programs – Addition/Subtraction. Multiplication/Division.
Description – Questions and answers on basic mathematics at different levels of difficulty.

Cassette E6: Fun to Learn series – Music 1 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6.95
Programs – Composers. Musicians.
Description – Which instrument does James Galway play? Who composed 'Peter Grimes'?

Cassette E7: Fun to Learn series – Inventions 1 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6.95
Programs – Inventions before 1850. Inventions since 1850.
Description – Who invented television? What was the 'dangerous Lucifer'?

Cassette E8: Fun to Learn series – Spelling 1 (ICL)
Hardware required – ZX81 + 16K RAM
Price – £6.95
Programs – Series A1-A15. Series B1-B15.
Description – Listen to the word spoken on your tape recorder then spell it out on your ZX81. 300 words in total suitable for 6-11 year olds.

Business/household

Cassette B1: The Collector's Pack (ICL)
Hardware required – ZX81 + 16K RAM
Price – £9.95
Program – Collector's Pack plus blank tape or side 2 for program/data storage.
Description – This comprehensive program should allow collectors (of stamps, coins etc.) to hold up to 400 records of up to 6 different items on one cassette. Keep your records up to date and sorted into order.

Cassette B2: The Club Record Controller (ICL)
Hardware required – ZX81 + 16K RAM
Price – £9.95
Program – Club Record Controller plus blank tape on side 2 for program/data storage.
Description – Enables clubs to hold records of up to 100 members on one cassette. Allows for names, addresses, phone numbers plus five lots of additional information – eg type of membership.

Cassette B3: VU-CALC (Psion)
Hardware required – ZX81 + 16K RAM
Price – £7.95
Program – VU-CALC
Description – Turns your ZX81 into an immensely powerful analysis chart. VU-CALC constructs, generates and calculates large tables for applications such as financial analysis, budget sheets and projections. Complete with full instructions.

Cassette B4: VU-FILE (Psion)
Hardware required – ZX81 + 16K RAM
Price – £7.95
Programs – VU-FILE. Examples.
Description – A general-purpose information storage and retrieval program with emphasis on user-friendliness and visual display. Use it to catalogue your collection, maintain records or club memberships, keep track of your accounts or as a telephone directory.

How to order

Simply use the FREEPOST order form below and either enclose a cheque or give us your credit card number. Credit card holders can order by phone – simply call Camberley (0276) 66104 or 21282 during office hours. Either way, please allow up to 28 days for delivery, and there's a 14-day money-back option, of course.

sinclair ZX81 SOFTWARE

Sinclair Research Ltd,
Stanhope Road, Camberley, Surrey GU15 3PS.
Tel: Camberley (0276) 66104 & 21282.

To: Sinclair Research, FREEPOST, Camberley, Surrey GU15 3BR.
Please send me the items I have indicated below.

Qty	Cassette	Code	Item price	Total	Qty	Cassette	Code	Item price	Total
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	G2 Super Programs 2	31	£4.95			E3 Geography 1	46	£6.95	
	G3 Super Programs 3	32	£4.95			E4 History 1	47	£6.95	
	G4 Super Programs 4	33	£4.95			E5 Mathematics 1	48	£6.95	
	G5 Super Programs 5	34	£4.95			E6 Music 1	49	£6.95	
	G6 Super Programs 6	35	£4.95			E7 Inventions 1	50	£6.95	
	G7 Super Programs 7	36	£4.95			E8 Spelling 1	51	£6.95	
	G8 Super Programs 8	37	£4.95			B1 Collectors Pack	52	£9.95	
	G9 Biorhythms	38	£6.95			B2 Club Record Controller	53	£9.95	
	G10 Backgammon	39	£5.95			B3 VU-CALC	54	£7.95	
	G11 Chess	40	£6.95			B4 VU-FILE	55	£7.95	
	G12 Fantasy Games	41	£4.75			ZX 16K RAM pack	18	£39.95	
	G13 Space Raiders & Bomber	42	£3.95			ZX Printer	27	£59.95	
	G14 Flight Simulation	43	£5.95			Post & packing only if ordering hardware		£2.95	
	E1 English Literature 1	44	£6.95						

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